RESEARCH ARTICLE

Perception of Students towards Conservation of Forest Resources: a case study from Western Himalaya, India

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Manuscript Info

Abstract

Tremendous strides have been made both in scientific research and education in India since independence resulted in an enormous expansion and improvement in the research and development (R&D) sector and education systems. However, the quality of research and education has been a major victim of this rapid and enormous expansion, as reflected by the perceptions of students/scholars towards conservation of biodiversity in the country. The present study has attempted to highlight the current status of conservation programmes being organized in different part of country and need for future conservation strategies for natural resources through student involvement, which are likely to be the future of the world. Student's performance on two environmental issues has been analyzed across different districts of Kumaun region in Uttarakhand state. Based on three important criteria, such as general understanding, knowledge and willingness, the grade list was developed. General understanding carries a greater value in view of the potential to express the respondent's concerns about above mentioned environmental issues. The major discouraging result of the study is that we could not receive the expected responses on most important criteria 'willingness'. Involvement of perception of students must be considered as an important step for future sustainable conservation of natural resources. Science education through motivation does not give answers but creates inquisitiveness to find answers. The networks and partnerships with schools, teachers, scientific institutions and NGOs engaged in science motivation/popularizations have to be strengthened to work as best as we can.

Introduction

Since independence, India has been committed to the task of promoting the spread of science and technology. Government of India enunciated a new Science and Technology Policy in January 2003 for advancing scientific temper in the new era of globalization. The focus of the policy is to ensure that the message of science reaches every citizen of India so that we as a progressive and enlightened society can make it possible for all our people to participate fully in the process of development of science and technology and its application for human well being (Maikhuri *et al.,* 2010 a,b). India currently has about 120,000 scientists, which is just one-tenth of the number in USA (Prathap, 2009). A major challenge is how to increase this pool in the face of declining interest in science education (Garg and Gupta, 2003) and high dropout rate. Another factor is that most developments, both in R&D and science education, have been city-centric; the rural sector has been grossly ignored (Deo and Pawar, 2011). Creativity being evenly distributed, our 'creative pool' can be tripled by tapping the intellectual capital that resides

in hitherto highly neglected villages which account for 70% of India's population (Deo and Pawar, 2011). Many rural and remote areas in the higher Himalayan zone in India are struggling to overcome the falling interest in the science education. There is need for supplementing school education with thought-provoking outreach programmes on topics outside the students' syllabus.

Discussion of various aspects of science education in India is never meaningful unless an effort is made to reach out to a large number of students residing in rural parts of India. Uttarakhand, the 27th State of the Indian republic, is well known for its rich biotic wealth and diverse cultural mosaic. The major vegetation types classified altitudinally being tropical, sub-tropical, temperate, sub-alpine and alpine (Samant *et al.,* 2001)**.** The region play an important role on providing ecosystem services to the global communities and contribute significantly towards food and livelihood security of over 400 million people of the Indo- Gengatic plain and nearby region (Singh *et al.,* 1994; Rao *et al.,* 2003; Prabhakar *et al.,* 2006). However, over the last few decades, as a result of the development activities and other anthropogenic interferences, the natural resources mainly the forests, have been overexploited. Two major reasons behind this could be i) resource dependency; and ii) forest fire. Due to both of the above mentioned reasons and under changing climate and socio-economic scenario, Himalayan forests are under threat. At larger extent, it is impossible to reduce the intensity of these losses being dependent on the state or central government initiatives. One possible step which has been highlighted world wide to address such issues is environmental education (EE) programme (Dhar *et al.,* 2002). As elsewhere in the world, EE programmes in India gained much consideration during last few decades. In Chapter 36 of AGENDA 21 **(**Rio-1992**),** call upon reorientation of education towards improving the capacity of people to address environment and development issues. The present paper is an attempt to document and examine the perception of students in the light of above mentioned concerns in Kumaon region of Uttarakhand.

Methods
Study area
The state is comprises of 13 districts and lies between $28^043'$-$31^08'$ N and $77^035'$-$81^02'$ E. It is bounded to the northwest by Himachal Pradesh, to the north by Tibet (China), to the east by Nepal, and to the south by Uttar Pradesh. Uttarakhnad covers about 12.18 % of the total Indian Himalaya, and 45.74 % of its total area has different forest type. It is 3.60% of India's total forest cover. The average rainfall recorded in this state is 1000-2000 mm per year. Elevation ranges from 210 to 7817 m over the total area 53485 km^2 (Nandy and Rao, 2001).

Survey methods
Before initiating the science motivational training programmes, an in-depth rapid appraisal survey was carried out to select schools and students from all the hill districts of Kumaon region. In this direction we have chosen the schools located in diverse situations and topographies i.e. near to road network, near township, away from township with good road connectivity and remotely located places those are away from road network. Keeping in mind the dominance of forest cover over hilly areas, six centers from Kumaon region of Uttarakhand i.e., Almora, Pithoragarh, Bageshwar, Nainital, Kosi and Ranikhet were selected to gather information. In hilly areas people spend their life in and around the forests and forests play a vital role in each and every aspect of their life. Therefore it was assumed that their views must be the representative for the whole Kumaon region. A total of 34 schools were identifies from four districts.

Grading procedure
Informants were selected randomly from different schools which were gathered to participate in world environment day programmes on different days/dates. Based on three important criteria, such as understanding, knowledge and willingness, the grade list was developed (Box 1). Knowledge is further sub-divided in three categories according to the subject**.** Students were asked to share their views on general understanding about the question asked, factual knowledge and interest for their active involvement **(**Box 1**).** Grades in from of strikes were defined to respondents on their views on above defined criteria (*= no response; **= fair; ***= good and; ****= excellent) as well as in different categories (class wise= 6-8, 9-10, 11-12; gender wise = male, female and; locality wise= village, town) to understand their perception from different angles. All grades on different categories were pooled and average was measured for each question (Table 1). Average percentage on perceptions was also calculated to find out the number of school involved and their responses on particular criteria in different categories (Table 2).

Results
General Understanding of target questions
Forest fire in mountains: why, how and what can I do?

Target centers are almost equally understand the question and are similarly concerned about the forest fire. Their level of understanding is graded fair. Class, gender and locality wise understanding falls in good grade except some lower classes does not understand the question as other do. Center wise grades put Pithoragarh and Bageshwar at top with good understanding on forest fire. Surprisingly these two areas have the remotest location with tribal communities. In different categories respondent with good grade emphasized the definition of fire and its good examples from surrounding and its drastic effects, while other having fair grade laid focus on forest fire definition picked from coerce books (Table 1).

Under class category the average percent perception of lower group (6-8) showed that out of all schools, 75% has fair understanding while 25% were good. Group 9-10 and 11-12 both showed 67 % of schools having fair understanding. Under gender category, ratio of good and fair understanding was 50:50 in male, while in female it was 60:40. Locality wise similar ratio was observed between good and fair understanding and that was 50:50 (Table 2).

Mountain forests and People: importance, human dependency and our responsibility

All three class groups showed good understanding about the mountain forests. In compare to forest fire, students below 10th standard have good understanding on this question. Male students expressed more views and concepts about mountain forests in compared to female students. On the other hand, respondent from towns were more enthusiastic about this question in compared to village. Center wise analysis kept Pithoragarh, Bageshwar and Kosi centers at top (Table 1). The average percent perception showed increasing ratio between good and fair understanding from class group 6-8 (25:50), 9-10(60:40) to 11-12 (80:20). Male represent better perception (80% good; 20% fair) than female (100% fair). From village 20% schools expressed excellent perception while 80% fair. In towns, 80% of schools are having good and 20 % having fair understanding (Table 2).

Factual knowledge of the subject

Forest fire in mountains: why, how and what can I do?

Responses for factual knowledge were comparatively low as it in general understanding in all categories. Although, good responses came from the students of 9-10 standard on sub criteria *cause* (Table 1). This sub criterion was also well defined by male students under gender category, village students under locality category and Pithoragarh and Bageshwar under centers category. Other sub criteria *type* remained either untouched or partially touched. Similar grades were observed in third sub criteria *prevention* (Table 2). Average percent perception on knowledge showed almost similar number of schools under each class group having fair and good (25% to 50%) perceptions while almost 30 % did not responded. Under gender category the average ratio was 20:60 between good and fair and 20% did not responded. In village the number of schools responded fair were quite low compared to town (50:67) while number of schools did not responded anyway were high (33:17) (Table 2).

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Compared to responses on general understanding the response on factual knowledge was low in all three sub criteria except a few respondents from Pithoragarh centre. Sub criteria *type* was poorly defined, while importance was partially covered. *Dependency* was well explained by all categories. A few respondent tried to define some types of forest from their immediate surrounding were graded fair. Importance was very well defined especially by some respondent from Pithoragh centre who spoke on threats and resources provided by forests, new records etc. Major emphasis was laid on sub criteria *dependency* which was well defined by senior students in class, males in gender, towns in locality and Pithoragarh and Ranikhet in centers (Table 1). In class groups, the percentage of perception on knowledge varies from good, fair to no response. Respondent with good perception increase according to class groups (Table 2). Male are good in knowledge than females and towns and village have equal number of schools having fair perceptions. In all categories the number of students who did not respond is almost equal (Table 2).

Willingness

Forest fire in mountains: why, how and what can I do?

All categories responded fairly on willingness but few centers did not responded over the question (Table 1). In class category the number of schools with fair perception is equal in each class group (50% each) while ratio of schools who did not responded was higher in higher class group (50%). The number of those, who did not responded, was highest in this criterion. Although the number of schools with fair grading under gender category are quite good (male= 50; female= 60) but the number of no responded schools are also good in numbers (33:40). In towns, 17 % schools showed excellent and 50 % showed good perception which is comparatively better than village (Table 2).

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Except some fluctuation in grades in centers, rest of categories showed fair perception on willingness. Kosi and Bageshwar centers kept their self at top with highest grades while Nainital din not respond again. Some of the respondent spoke very well and emphasized upon the importance of plantation, reforestation and sustainable utilization and indicated how to avoid the destruction through the active involvement of students (Table 1). The percent perception on willingness increases with increasing class groups (6-8= 67%; 9-10= 60%; 11-12= 80) under fair grade and the number of schools who did not responded are quite low in compared to the perception on willingness in forest fire. Responses are almost similar under gender and locality (Table 2).

Discussion

The present study has attempted to highlight the current status of conservation programmes being organized in different part of country and need for future conservation strategies for natural resources through student involvement, which are likely to be the future of the world. This study also highlighted the awareness and educational status of students in different localities of mountain region under different categories such as class, gender and locality. Apart from the formal education system, the need for disseminating conservation education in different part of globe is increasing day by day. Among conservation biologist, the development of skills to communicate with the public has been emphasized already (Jacobson, 1998; Meffe, 1998; Fleishman, 1999). This approach has pulled them off their formal education system and a formal Environmental education (EE) programme emerged. Among different types of stakeholder participate in conservation awareness programmes, students are always kept in great consideration because their perception could play a vital role in development of future conservation strategies which comes through their enthusiasm and interest to the subject, less polluted mind and uncanny thinking (Maikhuri *et al.,* 2010 a,b). Present study showed the perception of students on two suddenly asked questions related to today's major environmental concerns. One major limitation of the present data could be the smaller sample size; however, the randomness in representation of respondents deserves equal consideration to judge the strength of interpretations.

General understanding carries a greater value in view of the potential to express the respondent's concerns about above mentioned environmental issues. Under class category above 9th standard, students expressed better understanding on first question than those lower than 9th standard. Its is a reflection that maturity and level of education play a role in determining respondent's understanding about asked questions (Dhar *et al.,* 2002; Maikhuri *et al.,* 2010a). Modernization and bombardment of technologies increases the exposure and confidence of students in towns. So it is assumed that forest fire is more particular and practical issue than mountain forest as it can be easily available in books title wise. Therefore, perception on understanding and factual knowledge required wider vision and exposure to respond upon this question which naturally came from male and town students.

Factual knowledge on forest fire was somehow poor especially on type and prevention. Under class group all three sub classes responded similar in all three sub criteria of factual knowledge except middle class group exceeded other two sub classes in responding better on causes of forest fire. Factual knowledge on second question was almost similar by class group as it was in forest fire. On sub criteria type above 10th standard student express their inability to respond, although they responded well on dependency on mountain forests. In gender and locality the perception on all three sub criteria was fair except male and village students expressed some good views on causes of forest fire while in second question, type and importance of mountain forest remained partially touched while dependency on these forests was comparatively well defined by respondents from male side and towns. In above discussed criteria, our study has been supported by the facts concluded for different kind of responses from class, age and gender (Dhar *et al.,* 2002; Maikhuri *et al.,* 2010 a,b; Deo and Pawar, 2011).

First major discouraging result of the study is that we could not receive the expected responses on most important criteria 'willingness'. Under all sub categories the average response was fair. Most of the students tried to explain the parroted contents from books. They assured their participation through information dissemination particularly. In general, students largely fail to respond enthusiastically on given global environmental concern and therefore do not express willingness like in other studies in other part of the world (Holl *et al.,* 1999; Gigliotti, 1992, 1994). Similar observations of low level of factual knowledge among educated mass about general environmental problems have been reported elsewhere (Holl et al., 1999). Second result which was a cause of dissatisfaction was the percentage of schools under different category, who could not respond on some criteria especially factual knowledge. This suggests that general environmental issues should be incorporated along with the course material and subject specialist must be appointed for the same. Finally, we would like to state that overall perceptions reflect the dominance of maturity, experience, education and exposure. Poor quality of education has adversely affected innovations, which is one of the weakest areas of Indian science and technology. Science motivation and popularization has been regarded as an effective method of making India a great power by exploiting peoples' wisdom in the development process (Maikhuri *et al.,* 2010 a,b; Deo and Pawar, 2011). This study also support the top-down approach of nature conservation (Moench and Bandyopadhyay, 1986) in different regions in mountains.

Need of good trainings and awareness programmes are emphasized which definitely could widened the views of students. Science education through motivation does not give answers but creates inquisitiveness to find answers. The networks and partnerships with schools, teachers, scientific institutions and NGOs engaged in science motivation/popularizations have to be strengthened to work as best as we can. Therefore, involvement of perception of students must be considered as an important step for future sustainable conservation of natural resources. In order to strengthen and generate curiosity among the students towards science, it is essential to ensure that students and teachers acquire and constantly improve their capacity building and training approaches which provide the practical skills.

Acknowledgement

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Box 1.
Structure of grade list

General understanding and concerns about forest resources and forest destruction
- What is fire/what are hill forests
- Some examples to illustrate destruction to forests through fire and resource dependency in your surrounding
- Other examples from all over the world

Factual knowledge of subject
- Type of fire/ forest
- Cause fire/importance of forest
- Prevention of fire/ dependency on forests

Willingness
- Through knowledge sharing
- Knowledge dissemination
- Active participation

Table 1. Average grading on student's perception towards forest fire and forest resources under different categories

*= no response; **=Fair; ***= Good; ****= Excellent

	Forest Fire					Mountain forests and People				
	Understanding	Knowledge			Willingness	Understanding	Knowledge			Willingness
		Type	Causes	Prevention			Type	Importance	Dependency	
Class										
6-8	**	**	**	**	**	***	**	**	**	**
9-10	***	**	***	**	**	***	**	**	**	**
11-12	***	**	**	**	**	***	*	**	***	**
Gender										
Male	***	**	***	**	**	***	**	**	***	**
Female	***	**	**	**	**	**	**	**	**	**
Locality										
Village	***	**	***	**	**	**	*	**	**	**
Town	***	**	**	**	**	***	**	**	***	**
Centre										
Pithoragarh	***	**	***	**	**	***	**	***	***	**
Almora	**	*	**	*	*	**	*	**	**	*
Kosi-Almora	**	*	**	**	**	***	*	**	***	***
Bageshwar	***	**	***	**	**	***	*	**	**	***
Nainital	**	*	**	**	*	**	**	**	**	*
Ranikhet	**	*	**	**	*	*	*	*	*	*

Table 2. Average percent perception on both the criteria under different category from 6 target centers

Class	Grade	Forest Fire			Mountain forests and People		
		Understanding %	Knowledge%	Willingness%	Understanding%	Knowledge%	Willingness%
6-8	Excellent	0	0	0	0	0	0
	Good	25	25	25	25	0	0
	Fair	75	50	50	50	67	67
	No response	0	25	25	0	33	33
9-10	Excellent	0	0	0	0	0	0
	Good	33	17	33	60	20	20
	Fair	67	50	50	40	40	60
	No response	0	33	17	0	40	20
11-12	Excellent	0	0	0	0	0	0
	Good	33	17	17	80	40	0
	Fair	67	50	33	20	40	80
	No response	0	33	50	0	20	20
Gender							
Male	Excellent	0	0	0	0	0	0
	Good	50	17	17	80	40	20
	Fair	50	67	50	20	40	40
	No response	0	17	33	0	20	40
Female	Excellent	0	0	0	0	0	0
	Good	60	20	0	0	0	20
	Fair	40	60	60	100	80	20
	No response	0	20	40	0	20	60
Locality							
Village	Excellent	0	0	0	20	0	0
	Good	50	17	0	0	20	0
	Fair	50	50	83	80	60	60
	No response	0	33	17	0	20	40
Town	Excellent	0	0	17	0	0	0
	Good	50	17	50	80	40	20
	Fair	50	67	33	20	60	40
	No response	0	17	0	0	20	40